SEMESTER I & II

PCPHG20 - PRACTICAL - I: GENERAL EXPERIMENTS

Year: I **Sem:** I & II	**Course Code:** PCPHG20	**Title of the Course:** Practical I: General Experiments	**Course Type:** Practical	**Course Category:** Core	**H/W** 3	**Credits** 4	**Marks** 100

Course Objectives

1. To understand the concepts and principles behind in experimental physics.
2. To teach the students to measure the electrical, mechanical, thermal and magnetic properties of materials.
3. Students are trained to handle advanced sophisticated equipments and analyze the data.

Course Outcomes (CO)

The learners will be able to

1. Measure electrical, magnetic and thermo-dynamical properties of solids.
2. Measure the thickness of glass plate (mechanical property) by using cornu's method
3. To find the wavelength of different colors through solar, mercury and hydrogen spectrum.
4. Calculate the acceptance angle and light gathering capability and attenuation properties of optical fiber and find out the Viscosity, specific rotary power and polarizability of different liquids through various experiments.
5. Develop the skills to take an accurate reading and analyze the results of experiments and to solve problems while handling with analytical instruments.

CO	**PSO**					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	H	L	H	H	H
CO2	H	H	L	M	L	H
CO3	H	H	M	M	M	H
CO4	H	H	M	H	M	H
CO5	H	H	L	M	H	H

CO	**PO**					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	H	H	M	H
CO2	M	H	H	M	M	M
CO3	M	H	M	H	H	H
CO4	H	M	H	M	H	M
CO5	M	H	H	M	M	H

(Low - L, Medium – M, High - H)

Course Syllabus

(Any 15 experiments)

1. Cornu's method - Determination of Young's modulus of the material beam by elliptical fringes.
2. Cornu's method - Determination of Young's modulus of the material beam by hyperbolic fringes.
3. Determination of Stefan's constant.
4. Band gap energy - using point contact diode (Ge and Si)
5. Hartmann's formula - Determination of wavelength of spectral lines in mercury spectrum.
6. Determination of Rydberg's constant - Hydrogen and Neon spectrum.
7. Solar spectrum - Hartmann's interpolation formula.
8. Co-efficient of linear expansion - Air wedge method.
9. Viscosity of liquid - Meyer's disc.
10. F.P.Etalon- using Spectrometer.
11. Specific charge of an electron –Magnetron method.
12. Energy bandgap of a Semiconductor - Four Probe method (as a function of temperature).
13. Edser and Butler fringes - Thickness of air film.
14. Spectrometer - Charge of an electron.
15. Spectrometer - Polarisability of liquids by finding the refractive indices at different wavelengths.
16. Permittivity of a liquid using RFO.
17. B-H loop using Anchor ring.
18. Determination of strain hardening co-efficient.
19. Determination of Audio frequencies - Bridge method.
20. Specific heat of a liquid - Ferguson's method.
21. Measurement of Numerical aperture (NA) of a telecommunication graded index optic fiber (for different length of fibers).
22. Fiber attenuation of the given optical fiber (between different lengths of fibers).
23. Biprism - Wavelength of monochromatic source - using Spectrometer.
24. Determination of specific rotatory power of a liquid using polarimeter.
25. Compressibility of a liquid using ultrasonic interferometer.
26. Lasers: study of laser beam parameters.

SEMESTER I & II

PCPHH20 - ELECTRONICS LAB

Year: I **Sem:** I & II	**Course Code:** PCPHH20	**Title of the Course:** Electronics Lab	**Course Type:** Lab	**Course Category:** Core	**H/W** 3	**Credits** 4	**Marks** 100

Course Objectives

1. Students will learn and understand the Basics of digital electronics.
2. To analyze logic processes and implement logical operations using combinational logic circuits.
3. To understand concepts of sequential circuits and to analyze sequential systems.
4. To analyze the different RC and LC oscillator circuits to determine the frequency of oscillation

Course Outcomes (CO)

The learners will be able to

1. Identify the various digital ICs and understand their operation.
2. Develop a digital logic and apply it to solve real life problems.
3. Analyze, design and implement combinational logic circuits.
4. Analyze, design and implement sequential logic circuits.
5. Design the different oscillator circuits for various frequencies.

CO	**PSO**					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	M	H	M	M
CO2	H	M	M	H	H	H
CO3	H	L	H	M	L	M
CO4	H	L	H	M	M	H
CO5	H	L	H	M	L	M

CO	**PO**					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low - L, Medium – M, High - H)

Course Syllabus

(Any 18 experiments)

List of experiments (K1 - K6):

1. V-I Characteristics of SCR and TRIAC.
2. Study of Rectifiers using C, L-C and Pi filters.
3. Study of Voltage - Current characteristics of UJT & UJT as a Relaxation Oscillator.
4. FET as amplifier - frequency response, input impedance and output impedance.
5. Study of V-I Characteristics of J-FET as a VVR (Voltage Variable Resistor).
6. Study of V-I Characteristics of MOSFET.
7. Op-amp - Voltage follower (Inverting) summing, difference, average amplifier- differentiator and integrator.
8. Op-amp - Solving simultaneous equations.
9. Op-amp - Design of square wave generator, triangular wave generator and saw tooth wave generator.
10. Op-amp - 4 bit D/A converter - Binary Weighted Resistor method and R-2R ladder method
11. Op-amp - Design of active Low pass, High pass, Band Pass and band rejector filter.
12. Op-amp - Study of attenuation characteristics and design of Phase Shift Oscillator.
13. Op-amp –Study of attenuation characteristics and design of Wien Bridge Oscillator.
14. IC 555 - Construction of Monostable Multivibrator, Frequency Divider
15. IC 555 -Design of Schmitt Trigger and hysteresis.
16. IC 555 - Construction of Astablemultivibrator and Voltage controlled Oscillator
17. Design of Synchronous and Asynchronous Counters using IC-7476/ 7473.
18. Construction of 4 bit Shift Register - Ring Counter and Johnson Counter - IC7476
19. Study of i) Multiplexer and using IC 74150
    ii) De-Multiplexer using IC 74154
20. Arithmetic operations (Adder/Subtractor) Using IC 7483.
21. Modulus counter using IC7490 and display using IC7447.
22. Phase locked loops using IC 555.
23. Binary adder abdSubtractor using EX-OR and NAND gates.

SEMESTER IV

PCPHO20- PRACTICAL III: ADVANCED GENERAL EXPERIMENTS

Year: II **Sem:** IV	**Course Code:** PCPHO20	**Title of the Course:** Practical III: Advanced General Experiments	**Course Type:** Practical	**Course Category:** Core	**H/W** 4	**Credits** 4	**Marks** 100

Course Objectives

1. To provide the student hands-on experiences to conduct advanced general experiments in laboratory in lieu with the theory taught in the class.

Course Outcomes (CO)

The learners will be able to

1. Interpret and appreciate the advanced concepts in physics.
2. Use scientific equipment for analysis and data acquisition.
3. Analyse the properties (electric, magnetic, nuclear and dielectric) of solids/liquids.
4. Apply acquired knowledge to the analysis of experimental data.
5. Get exposure to work environment at research level and motivation for a lifelong learning.

CLO	**PSO**					
	1	**2**	**3**	**4**	**5**	**6**
CLO1	H	L	H	L	H	H
CLO2	M	H	L	M	H	H
CLO3	H	H	H	M	H	H
CLO4	H	M	H	L	H	H
CLO5	L	M	L	L	H	H

CLO	**PO**					
	1	**2**	**3**	**4**	**5**	**6**
CLO1	H	H	H	H	H	H
CLO2	H	H	M	M	H	H
CLO3	H	H	H	M	H	H
CLO4	H	M	H	M	H	H
CLO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

Course Syllabus

(Any 15 experiments) (K1 - K6)

1. G.M. Counter - characteristics, Inverse square law.
2. G.M. Counter - Absorption co-efficient.
3. Determination of Carrier Concentration - Hall Effect.
4. Determination of Volume Susceptibility of a liquid by Quincke's method.
5. Determination of Mass Susceptibility of a liquid by Guoy's method.
6. Michelson Interferometer -Wavelength and separation of wavelengths.
7. Michelson Interferometer - Thickness of mica sheet.
8. F.P. Etalon using Michelson set up.
9. Determination of Wave length of Laser Beam.
10. Ultrasonic Interferometer - Velocity and Compressibility of a liquid.
11. Ultrasonic Diffraction - Velocity and Compressibility of a liquid.
12. Determination of Planck's constant.
13. B-H curve using CRO.
14. Salt Analysis using Spectrograph - CDS
15. Dielectric constant of liquids and solids by capacitance method.
16. Determination of coefficient of coupling by AC bridge method.
17. Impedance measurement using LCR bridge.
18. Four probe method - Determination of conductivity of thin films.
19. Determination of dielectric loss using CRO.
20. Laser diode characteristics.